Rad-hard Reconfigurable Bi-Directional Level Shifters Technology for Micro- and Nanosatellites, Phase I

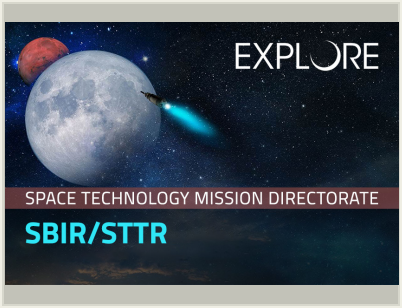
Completed Technology Project (2005 - 2005)

Project Introduction

Various technologies available to space system designers that operate at different voltage levels. It is, however, important to interface, maintain, and update these systems. For example, the Sun Earth Connection (SEC) missions are likely to have a variety of experiments needing to be accomplished with a single nanosatellite. A rad-hard reconfigurable bi-directional level shifters would allow them to accomplish this goal despite the various multi-voltage level systems employed within the satellite. Additionally, a level shifter could be used to extend and/or expand the life of existing space systems. Presently and in the future, nanosatellites and other spacecraft have need for rad-hard reconfigurable bi-directional level shifters to enable there existing systems the ability to communicate logic signals to other lower voltage level systems. This proposal is to develop such a level shifter. This will allow these systems to continue to conduct operations and missions for the existing and a growing number of future users. Space system applications for SEC missions have mass, power, cost, and rad-hard limitations on all of their circuits. A rad-hard reconfigurable bi-directional level shifter design would provide for these needs between multilevel voltage technologies to aid in their missions.

Anticipated Benefits

The development of reconfigurable bi-directional level shifter components will provide significant performance improvement and better multifunctional use for space system designers. Two marketing channels are open for American Semiconductor commercialization of this technology. Channel 1: American Semiconductor may license the reconfigurable bi-directional level shifter to support manufacturers who wish to use our IP library for their needs and requirements for general design. Channel 2: Innovative technologies applied to reconfigurable bi-directional level shifter are attractive for licensing by parts companies such as JPL. American Semiconductor, Inc. will focus this SBIR to present a radhard reconfigurable bi-directional level shifters design, with bi-directional operation to permit two way communications between systems for the purpose of integration of current and future systems. This will allow systems the ability to communicate and function together utilizing a longer life span for current and future space-bound equipment. Benefits will also include a radhard, low power, and sub-lithographic process utilization. This will significantly improve the integration of components from different technology generations.



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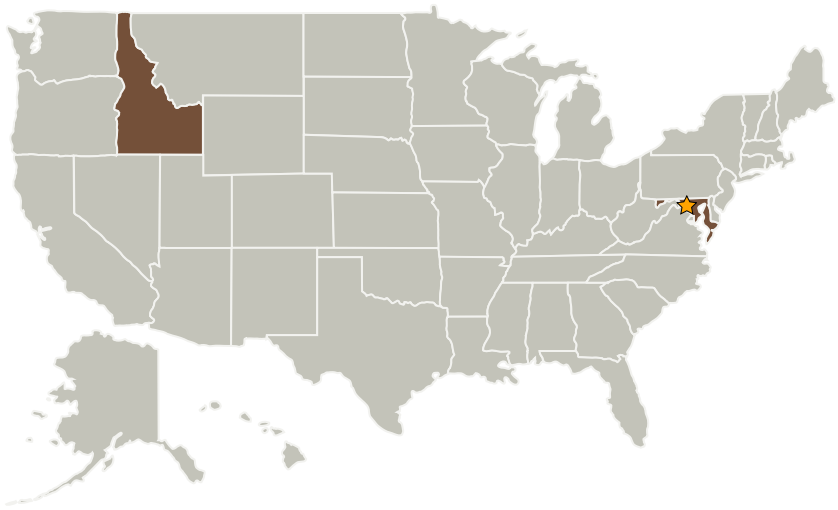
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
American Semiconductor, Inc.	Supporting Organization	Industry	Boise, Idaho

Primary U.S. Work Locations	
Idaho	Maryland

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Project Managers:

Olga M Dominguez
Namrita K Owens

Principal Investigators:

Joseph S Mahaley
Kelly Degregorio

Technology Areas

Primary:

- TX07 Exploration Destination Systems

Continued on following page.

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Technology Areas *(cont.)*

- TX07.2 Mission Infrastructure, Sustainability, and Supportability
  - TX07.2.1 Logistics Management